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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/891,002	06/25/2001	Scott Burgett	702.100	9418

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EXAMINER	
SUN, XIUQIN	
ART UNIT	PAPER NUMBER
2863	

DATE MAILED: 04/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/891,002	BURGETT ET AL.	
	Examiner	Art Unit	
	Xiuqin Sun	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-36 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) 16,17 and 21-34 is/are allowed.

6)☒ Claim(s) 1,2,4,5,7-15,18,35 and 36 is/are rejected.

7)☒ Claim(s) 3,6,19 and 20 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 27 August 2001 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Drawings

1. The drawings are objected to because:

   1) In Fig. 1, the housing 12 recited in the specification is not labeled.

   2) In Fig. 2, the label for the "GPS receiver" should be changed to 24 in accordance with the specification.

A proposed drawing correction or corrected drawings are required in reply to the Office Action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: Page 6, line 16 –17, the use of "Fig. 4 illustrates a flow chart setting forth a processing sequence carried out in accordance with an embodiment of the present invention" should be consistent with the statement on page 15, line 3-4. Specifically, page 6, line 16-17 should be changed to "Fig. 4 illustrates a flow chart setting forth a processing sequence carried out in accordance with at least one embodiment of the present invention". Please advise.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 1-2, 4-5, 7-8, 10 and 18 are rejected under 35 U.S.C. 102(a) as being anticipated by Johnson et al. (U.S. Pat. No. 6216064).

Johnson et al. teach a navigation device comprising: a barometric altimeter for obtaining barometric elevation readings based on barometric pressure measurements (col. 3, lines 25-38; col. 4, lines 20-21; col. 5, lines 38-43); a processor for providing GPS elevation readings based on GPS measurements, said processor calculating differences between said barometric elevation readings and said GPS elevation readings (col. 3, lines 25-38; col. 24-25; col. 5, lines 44-49); a filter filtering said differences to produce a barometer correction quantity, said filter being adjustable between a short time constant and a long time constant (Figs. 12-16; col. 3, lines 39-67; col. 4, lines 1-12; col. 5, lines 64-67; col. 6, lines 1-7; and col. 10, lines 8-46); and said processor correcting said barometric elevation readings based on said barometer correction quantity (col. 3, lines 25-38; col. 5, lines 50-57; col. 9, lines 46-67 and col. 17, lines 1-33). Johnson et al. further teach a method for estimating altitude based on GPS and barometric measurements, comprising: deriving a barometric elevation from a barometer pressure measurement and an atmospheric pressure model (col. 6 lines 55-67; and col. 7, lines 1-23); deriving a GPS elevation from GPS information (col. 8, line 64 to col. 9, line 25); correcting said barometric elevation based on a coarse calibration

of the atmospheric pressure model to obtain a coarse estimated altitude (col. 9, lines 46-67); and after the coarse calibration, correcting the barometric altitude based on a difference between the derived barometric and GPS elevations to obtain a fine estimated elevation (col. 10, lines 49-67 and col. 17, lines 1-33). Johnson et al. further teach that: a calibration unit calibrating said barometric altimeter based on said barometric altitude correction quantity continuously while simultaneous providing navigation information (col. 9, lines 48-65; col. 18, lines 6-36; col. 19, lines 58-67 and col. 20, lines 1-4); said filter performs the filtering operation based upon one of multiple sets of filter gain parameters, said processor setting said filter, when initially turned to one of said multiple sets of filter gain parameters based upon an elapsed time since said barometric altimeter was last calibrated (col. 10, lines 37-46, lines 50-67; col. 11, lines 1-16; col. 18, lines 6-36; col. 19, lines 58-67 and col. 20, lines 1-4); said filter uses a first set of filter gain values to perform short-term averaging of said differences and a second set of filter gain values to perform long-term averaging of said differences (col. 9, lines 49-67; col. 10, lines 1-46; col. 17, lines 60-67; col. 18, lines 1-3 and col. 19, lines 28-30); said processor and filter calibrate said barometric altimeter while the navigation device is in motion during which elevation changes (col. 9, lines 48-65); said processor and filter continuously calculate said barometric altimeter correction quantity throughout operation while in a navigation mode (col. 9, lines 48-65; col. 18, lines 6-36; col. 19, lines 58-67 and col. 20, lines 1-4); an atmosphere model associating barometric pressure measurements to elevations, said processor adjusting said atmosphere model at least once during operation by recalculating said elevations associated with said

barometric pressure measurements based on said differences between said barometric elevation readings and GPS elevation readings (col. 7, lines 12-35; col. 13, lines 1-67 and col. 14, lines 1-20); and filtering noise from said barometric altitude in fine and coarse calibration operations, said recalibrating step being performed at least once each time said fine calibration operation is performed (col. 3, lines 39-67; col. 4, lines 1-12; col. 5, lines 64-67; col. 6, lines 1-7; col. 7, lines 12-35; col. 10, lines 8-46; col. 13, lines 1-67 and col. 14, lines 1-20).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. (U.S. Pat. No. 6216064) in view of Burgett et al. (U.S. Pat. No. 6522298).

Johnson et al. teach a method used in a navigation device for estimating altitude based on measurements from a barometric sensor and a GPS receiver that includes the subject matter discussed above. Johnson et al. do not mention that: said barometric altimeter calculates barometric elevation readings based on an atmosphere model correlating barometric pressure readings to particular elevations, said processor

adjusting said atmosphere model continuously throughout operation based on said barometric altimeter correction quantity.

Burgett et al. disclose a device and method for calibrating and improving the accuracy of barometric altimeters with GPS-derived altitudes, and teach the means and step of calculating barometric elevation readings based on an atmosphere model correlating barometric pressure readings to particular elevations, and adjusting said atmosphere model continuously throughout operation based on the calibrated barometric altitude estimated using GPS (col. 8, lines 32-67 and col. 9, lines 1-9).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the teaching of Burgett et al. techniques for dynamic calibration of the atmosphere model in the Johnson system in order to correct the bias related to atmospheric model based on which the barometric elevation is derived (Burgett et al., col. 8, lines 32-67 and col. 9, lines 1-9).

7. Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. (U.S. Pat. No. 6216064) in view of Tao et al. (U.S. Pat. No. 5796609).

Johnson et al. teach a method, used in a navigation device, for estimating altitude based on measurements from a barometric sensor and measurements from a GPS receiver that includes the subject matter discussed above. Johnson et al. do not mention that: utilizing a state feedback loop to drive the difference between the elevation obtained based on barometric pressure measurements and the elevation obtained based on GPS coordinate information to zero; computing at least two gain values defining a rate at which said state feedback loop converges to zero, and using

one of said at least two gain values in said state feedback loop; selecting a gain value from a set of multiple gain values, said selected gain value controlling a rate at which said state feedback loop converges to zero; said state feedback loop continuously updates said altitude calculated based on said first elevation and said output of said state feedback; said state feedback loop updates, at discrete intervals non-continuously, said altitude calculated based on said first elevation and said output of said state feedback.

Tao et al. disclose a system and method for controlling a process, and teach: state feedback loop techniques that are used to drive the difference between a process output signal and a predicted process output signal to zero (col.1, lines 32-42; col. 5, lines 31-51; col. 6, lines 37-53; col. 7, lines 46-67 and col. 8, lines 1-50); computing at least two gain values defining a rate at which said state feedback loop converges to zero, and using one of said at least two gain values in said state feedback loop (col. 6, lines 66-67 and col. 7, lines 1-6); selecting a gain value from a set of multiple gain values, said selected gain value controlling a rate at which said state feedback loop converges to zero (col. 7, lines 14-19); said state feedback loop continuously, or at discrete intervals non-continuously, updates process output signal calculated based on the corresponding process input signal and the output of said state feedback (col. 1, lines 32-42; col. 7, lines 46-56 and col. 8, lines 20-28).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the teaching of Tao et al. state feedback loop in the Johnson system in order to perform dynamic calibration of process output signal, such

as the measurements from a barometric sensor, wherein external transient disturbances are rapidly rejected even when the measuring process includes relatively long time delay (Tao et al., col.1, lines 32-42 and col. 3, lines 11-16).

8. Claims 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. (U.S. Pat. No. 6216064) in view of Burgett et al. (U.S. Pat. No. 6522298).

Johnson et al. teach a method used in a navigation device for estimating altitude based on measurements from a barometric sensor and a GPS receiver that includes the subject matter discussed above. Johnson et al. do not mention that: re-calibrating said atmospheric pressure model by changing a model base pressure as a function of said barometric pressure and the barometric altitude calculated from the atmospheric model; and correcting said barometric altitude based on said re-calibrated atmospheric pressure model.

Burgett et al. teach the steps of re-calibrating said atmospheric pressure model by changing a model base pressure as a function of said barometric pressure and the barometric altitude calculated from the atmospheric model; and correcting said barometric altitude based on said re-calibrated atmospheric pressure model (Fig. 5; col. 5, lines 46-67 and col.6, lines 1-18).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the teaching of Burgett et al. techniques for dynamic calibration of the atmosphere model in the Johnson system in order to correct the bias

due to atmospheric model based on which the barometric elevation is derived while the navigation device is on he move (Burgett et al., abstract).

Allowable Subject Matter

9. Claims 3, 6, 19 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Claims 16-17 and 21-34 are allowed.

Reasons for Allowance

11. The following is an examiner's statement of reasons for allowance:

The primary reason for the allowance of dependent claim 3 is the inclusion of the limitation of a statistical model of barometric altimeter errors represented expected drift in the barometer elevation reading over a time lapsed since the device was last turned on, said filter adjusting filter characteristics between high and low gain based on said statistical model. It is this limitation found in the claim, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes this claim allowable over the prior art.

The primary reason for the allowance of dependent claim 6 is the inclusion of the limitation of a statistical model of anticipated errors in said barometric elevation readings, said filter using low gain when said statistical model indicates that an anticipated error is small, said filter using high gain when said statistical model indicates

that an anticipated error is large. It is this limitation found in the claim, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes this claim allowable over the prior art.

The primary reason for the allowance of independent claim 16 is the claimed method step of obtaining from a barometer drift model, an expected error in barometer readings based on the time lapse since last calibration. It is this limitation found in the claim, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes this claim allowable over the prior art.

The primary reason for the allowance of dependent claim 19 is the claimed method step of adjusting an initial base pressure of the atmospheric pressure model toward a standard pressure value based on an amount of uncertainty in the barometric elevation. It is this limitation found in the claim, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes this claim allowable over the prior art.

The primary reason for the allowance of dependent claim 20 is the claimed method step of adjusting an initial base pressure of the atmospheric pressure model toward a standard pressure value based on an amount of uncertainty in the GPS elevation. It is this limitation found in the claim, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes this claim allowable over the prior art.

The primary reason for the allowance of independent claim 21 is the claimed method steps of determining an expected drift error representing an amount of drift

anticipated in said barometer-based altitude based on a model of drift error; calculating a correction quantity based on convergence of a baro-GPS relation between said barometer-based and GPS-based altitudes toward a steady state value; and adjusting a rate of said convergence toward said steady state value based on said expected drift error. It is these limitations found in the claim, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes this claim allowable over the prior art.

In regard to dependent claims 17 and 22-34, they are allowed once the independent claim they depend on is allowed, even though they may contain allowable subject matter themselves.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuqin Sun whose telephone number is (703)305-3467. The examiner can normally be reached on 7:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (703)308-3126. The fax phone numbers

for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

XS
April 2, 2003

John Barlow
Supervisory Patent Examiner
Technology Center 2800